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CONTROL
Insects & Disease

September 6, 1978

James B. Hanson
Field Representative
Forest Insect & Disease Management
NA-State & Private Forestry
Folwell Avenue
St. Paul, Minnesota 55101

Dear Mr. Hanson:

Attached are our 1978 Insect and Disease Conditions Reports. I hope this completes the information you require.

Sincerely,

Ramon

RAMON D. GASS
Insect & Disease Specialist

RDG/cs

Enclosures

COMMISSION

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1978 I&D CONDITIONS REPORT

PEST: (common name) Redheaded pine sawfly
(specific name) Neodiprion lecontei

HOST: Shortleaf Pine

PRESENT CONDITIONS: Area - Continued around towersite plantings.

Location - Laclede and Pulaski Counties (outside range of shortleaf pine)

Severity (specify measurements or estimates) - light to moderate defoliation (20 to 50 percent of crown)

Losses (best estimates of volume and/or $) - No volume or value loss.

TREND:

Past to present - light to heavy

Future - light to moderate

CONTROL PROJECTS (method, material, acres, results) - only on individual trees in plantation

COMMENTS: In the last 16 years we have never found infestations on naturally occurring shortleaf pine.

1978 I&D CONDITIONS REPORT

PEST: (common name) European pine sawfly
(specific name) Neodiprion sertifer

HOST: Scotch and Mugho Pines

PRESENT CONDITIONS: Area - Adair County and St. Louis County (continued)

Location - localized

Severity (specify measurements or estimates) - 70 to 90 percent of affected plants

Losses (best estimates of volume and/or $) - no volume or value loss

TREND:

Past to present - light to heavy

Future - predicted to increase in areas above in 1979

CONTROL PROJECTS (method, material, acres, results) -

COMMENTS: This insect is only a local problem and is controlled where heavy in Christmas tree plantations.

1978 I&D CONDITIONS REPORT

PEST: (common name) Variable Oak Leaf Caterpillar
(specific name) Heterocampa manteo

HOST: Oaks

PRESENT CONDITIONS: Area - collapsed in all areas of the state.

Location -

Severity (specify measurements or estimates) - none

Losses (best estimates of volume and/or $) - none

TREND:

Past to present - 1969 outbreak to 1972

Future - negative

CONTROL PROJECTS (method, material, acres, results) - none

COMMENTS: Population collapsed in 1972. The insect is mentioned in annual reports to keep personnel informed of status.

1978 I&D CONDITIONS REPORT

PEST: (common name) Nantucket Pine Tipmoth
(specific name)

HOST: Shortleaf Pine (planted)

PRESENT CONDITIONS: Area - on planted pines located on fringe and out of natural range of shortleaf pine (continuing)

Location - South Missouri

Severity (specify measurements or estimates) - 3rd generation on some plantings affected every tip branch.

Losses (best estimates of volume and/or $) - no volume or value loss.

TREND:

Past to present - light to heavy

Future - same in future as populations fluctuate

CONTROL PROJECTS (method, material, acres, results) - no controls have been conducted

COMMENTS: Trees grow out of susceptible size beyond.

1978 I&D CONDITIONS REPORT

PEST: (common name) Asiatic oak weevil
(specific name) Cyrtepistomus castaneus

HOST: Oaks

PRESENT CONDITIONS: Area - continued over area below..

Location - southeast and south central Missouri

Severity (specify measurements or estimates) - 5 to 10% of infested trees foliage reduced

Losses (best estimates of volume and/or $) - no volume or dollar loss

TREND:

Past to present - light to moderate

Future - moderate and spreading

CONTROL PROJECTS (method, material, acres, results) - none

COMMENTS: This insect is more of a household nuisance.

1978 I&D CONDITIONS REPORT

PEST: (common name) Black Turpentine Beetle
(specific name) Dendroctonus terebraus

HOST: Shortleaf Pine

PRESENT CONDITIONS: Area - continued...

Location - throughout natural range of shortleaf pine.

Severity (specify measurements or estimates) - one tree per 640 acres

Losses (best estimates of volume and/or $) - negligible

TREND:

Past to present - endemic

Future - endemic with very few local infestations.

CONTROL PROJECTS (method, material, acres, results) - salvage during timber sales.

COMMENTS: This continues to be a localized endemic problem resulting in very small volume losses.

1978 I&D CONDITIONS REPORT

PEST: (common name) True tree grasshopper
(specific name) Dendrotettix quercus

HOST:

PRESENT CONDITIONS: Area - continued from northeast Iron County southwestward to Roby Tower in Texas county.

Location - Iron, Reynolds, and Texas Counties

Severity (specify measurements or estimates) - 20 percent of crown area defoliated.

Losses (best estimates of volume and/or $) - no value loss

TREND:

Past to present - light to moderate

Future - same as above as populations fluctuate.

CONTROL PROJECTS (method, material, acres, results) - none

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Pales weevil
(specific name) Hylobius pales

HOST: Scotch pine

PRESENT CONDITIONS: Area - continuing

Location - Harrison County Texas County

Severity (specify measurements or estimates) - 50 to 200 trees affected in Harrison County plantation

Losses (best estimates of volume and/or $) - loss in tree quality may amount to $2,000.

TREND:

Past to present - light

Future - light to moderate and building

CONTROL PROJECTS (method, material, acres, results) - various Christmas tree growers treated stumps with Thiodan and diesel fuel.

COMMENTS: Pales was also found in thinned shortleaf pine on the Winona U.S.F.S. Ranger District a number of years ago.

1978 I&D CONDITIONS REPORT

PEST: (common name) Evergreen bagworm
(specific name) Thyridopteryx ephemeraeformis

HOST: evergreens

PRESENT CONDITIONS: Area - wherever wild cedars and ornamental cedars grow (continuing)

Location - over state

Severity (specify measurements or estimates) - moderate to heavy on infested trees

Losses (best estimates of volume and/or $) - no available value loss

TREND:

Past to present - light to heavy

Future - light to heavy in future

CONTROL PROJECTS (method, material, acres, results) - individual shade tree owner controls

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Eastern tent caterpillar
(specific name) Malacosoma americanum

HOST: eastern black cherry

PRESENT CONDITIONS: Area - where black cherry occurs (increasing)

Location - mostly in south Missouri

Severity (specify measurements or estimates) - 2-3 webs per infested tree. Infestation involved two-thirds of eastern black cherry population.

Losses (best estimates of volume and/or $) - no value loss

TREND:

Past to present - none to heavy

Future - will build then collapse

CONTROL PROJECTS (method, material, acres, results) - none

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Loblolly pine sawfly
(specific name) Neodiprion taedae linearis

HOST: shortleaf pine

PRESENT CONDITIONS: Area - collapsed

Location - south central and southeast Missouri

Severity (specify measurements or estimates) - not measurable during 1978

Losses (best estimates of volume and/or $) - none

TREND:

Past to present - light to heavy

Future - light and will build

CONTROL PROJECTS (method, material, acres, results) - none

COMMENTS: In 1971 populations were heavy and then collapsed and have remained endemic since then.

1978 I&D CONDITIONS REPORT

PEST: (common name) Walnut caterpillar
(specific name) Datana integerrima

HOST: Walnut and Hickory

PRESENT CONDITIONS: Area - south central Missouri

Location - roadsides, plantations, yards in southwest and south central Missouri.

Severity (specify measurements or estimates) - 20 to 50 percent of crown of infested trees.

Losses (best estimates of volume and/or $) - losses if any are not available.

TREND:

Past to present - light to heavy

Future - same as populations fluctuate

CONTROL PROJECTS (method, material, acres, results) - none known to this writer.

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Fall Webworm
(specific name) Hyphantria cunea

HOST: walnut, persimmon, redbud, hickory

PRESENT CONDITIONS: Area - south central Missouri (continued)

Location - old fields, roadsides, lawns

Severity (specify measurements or estimates) - 1 to 5 webs per infested tree

Losses (best estimates of volume and/or $) - no value loss

TREND:

Past to present - moderate

Future - moderate

CONTROL PROJECTS (method, material, acres, results) - none except for individual shade tree owners.

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Gypsy Moth
(specific name)

Negative Report

HOST:

PRESENT CONDITIONS: Area -

Location -

Severity (specify measurements or estimates) -

Losses (best estimates of volume and/or $) -

TREND:

Past to present -

Future -

CONTROL PROJECTS (method, material, acres, results) -

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Spruce budworm
(specific name)

Negative Report

HOST:

PRESENT CONDITIONS: Area -

Location -

Severity (specify measurements or estimates) -

Losses (best estimates of volume and/or $) -

TREND:

Past to present -

Future -

CONTROL PROJECTS (method, material, acres, results) -

COMMENTS:

1978 I&D CONDITIONS REPORT

PEST: (common name) Living tree hardwood borer complex
(specific name)

HOST: Oaks

PRESENT CONDITIONS: Area - Mostly in south Missouri continued

Location - Where oaks grow in the state

Severity (specify measurements or estimates) - 1 to 8 attacks per infested boles

Losses (best estimates of volume and/or $) - lumber value loss estimated to be $600,000.00 annually

TREND:

Past to present - light to severe

Future - same as infestation continues

CONTROL PROJECTS (method, material, acres, results) - none except for silvicultural control

COMMENTS: This is a continuing major insect problem very difficult to reduce.

1978 I&D CONDITIONS REPORT

PEST: (common name) Sclerroderris canker
(specific name) Gremmeniella abietina

HOST: Red and Scotch Pine

PRESENT CONDITIONS: Area - Sclerroderris canker has not been found in Missouri.

Location - not applicable

Severity (specify measurements or estimates) - no damage present

Losses (best estimates of volume and/or $) - none

TREND:

Past to present - No past or present history of this disease

Future - Hopefully, spread into Missouri will be restricted by environmental conditions.

CONTROL PROJECTS (method, material, acres, results) - Not applicable

COMMENTS: Information on the disease has been distributed to inform our personnel of the possible occurrence of the disease. The disease will be carefully monitored for within the state.

1978 I&D CONDITIONS REPORT

PEST: (common name) Brown Spot Needle Blight
(specific name) Schirria acicola

HOST: Scotch Pine

PRESENT CONDITIONS: Area - The southwestern quarter of the state suffered the most problems from this disease. This location is linked to the greater concentration of christmas tree plantations within the state.

Location - The disease was verified in Jackson, Cass, Johnson, Greene, Lawrence, Dade, Newton, Boone, Morgan, Camden, Texas, and St. Charles counties.

Severity (specify measurements or estimates) - The disease varied in severity on individual plantations. Significant problems and losses were present in 40% of the plantations surveyed.

Losses (best estimates of volume and/or $) - Statewide losses to the disease would be approximately one hundred and fifty thousand dollars. This estimate does not include control cost.

TREND:

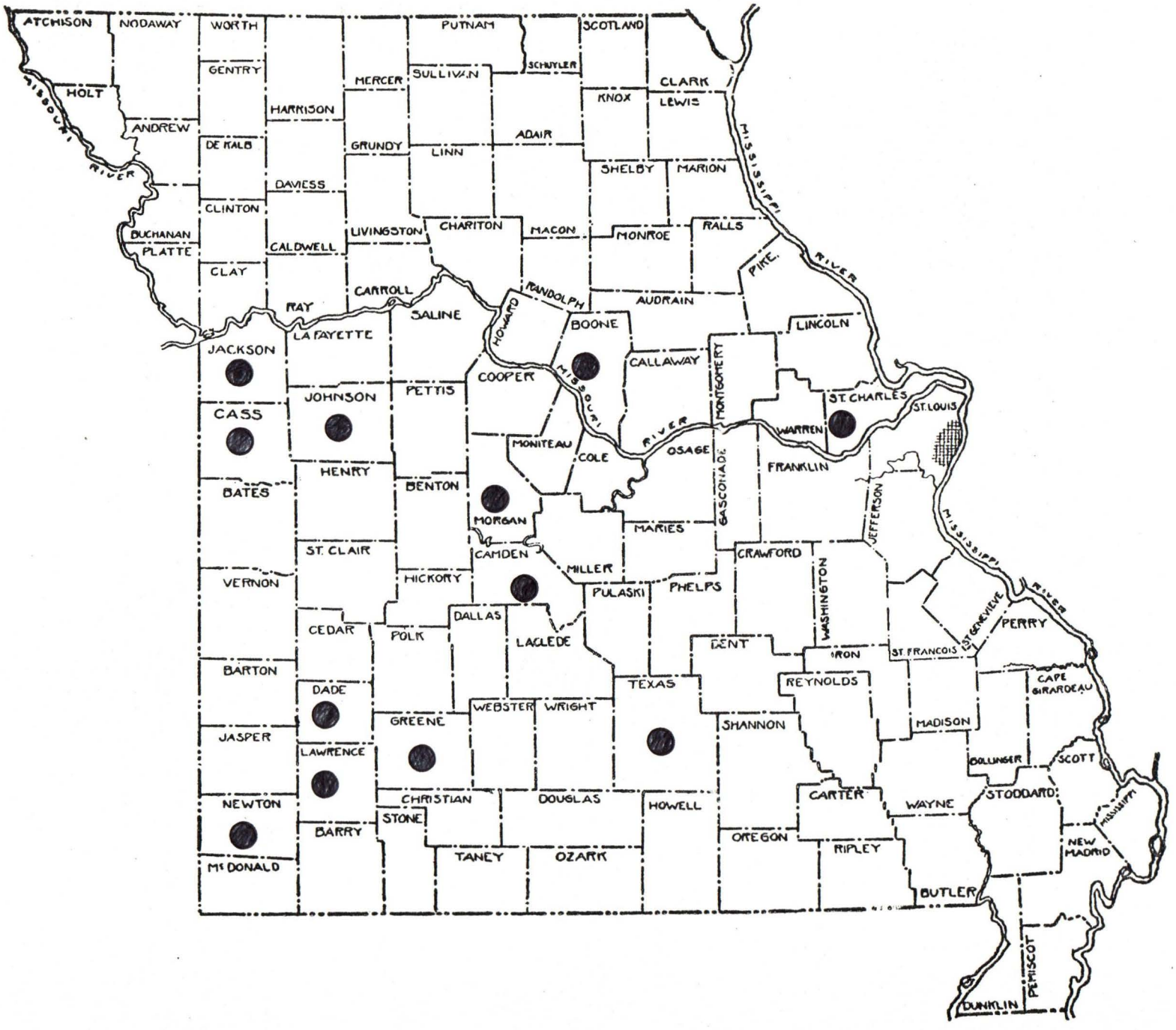
Past to present - A slight reduction in disease severity was noticed in comparison with 1977.

Future - Hopefully, disease losses are on the decrease as Christmas tree growers are becoming familiar with the disease and its control

CONTROL PROJECTS (method, material, acres, results) - An evaluation of fungicide capabilities was briefly initiated this year on sixty acres. Hopefully, a more detailed evaluation will be conducted in 1979. Control projects have been limited to personal training of individual growers and field personnel.

COMMENTS: This disease has been and continues to be a serious problem in Missouri. Christmas tree growers across the state are becoming better informed of preventative and control measures and are instituting these measures more widely.

BROWN SPOT NEEDLE BLIGHT



1978 I&D CONDITIONS REPORT

PEST: (common name) Oak Wilt
(specific name) Ceratocystis fagacearum

HOST: All oaks

PRESENT CONDITIONS: Area - Oak wilt is historically a statewide problem in Missouri. Southeastern Missouri is least affected by the disease but it still occurs there.

Location - The disease has been reported this year in Henry, Jackson, Andrew, Linn Lewis, Boone, St. Louis, Dent. Texas, Christian, and Stone Counties.

Severity (specify measurements or estimates) - Severe problems from this disease have not occurred widely. The disease is widespread in occurrence but large losses are rare. Occurrence this year has been lower than previous years.

Losses (best estimates of volume and/or $) - Commercial timber losses due to oak wilt have been insignificant. Substantial losses have occurred in urban plantings as a result of removal costs and property devaluation. An estimate of such losses would be approximately $200,000.

TREND:

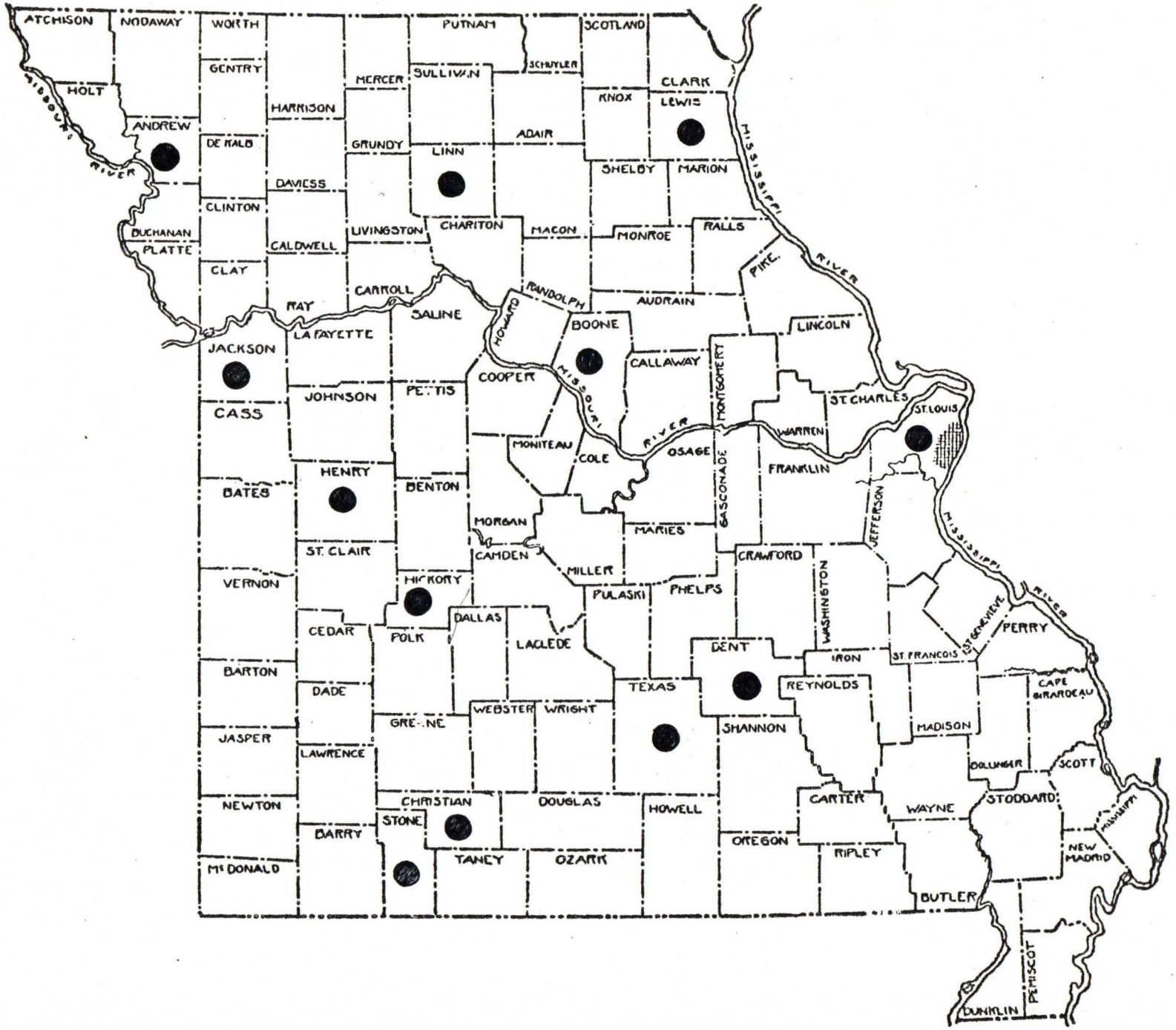
Past to present - The occurrence of oak wilt was slightly lower in 1978 than was present in 1977.

Future - The disease will continue to become a large problem in metropolitan areas. Losses in natural stands are generally insignificant due to the major species affected.

CONTROL PROJECTS (method, material, acres, results) - No specific control projects have been instituted. The losses have not justified intensive control procedures.

COMMENTS: Oak wilt apparently is becoming an increasing problem in urban areas. Informing the general public in preventative and control measures has been a large part of our control effort in Missouri.

OAK WILT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DE KALB
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LIVINGSTON
CHARITON
MACON
MONROE
RALLS
BUCHANAN
CALDWELL
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PIKE
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CARROLL
RANDOLPH
AUDRAIN
RAY
SALINE
HOWARD
BOONE
LINCOLN
LAFAYETTE
JACKSON
COOPER
CALLAWAY
MONTGOMERY
JOHNSON
PETTIS
ST. CHARLES
ST. LOUIS
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MARIES
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VERNON
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PHELPS
WASHINGTON
DALLAS
POLK
CEDAR
LACLEDE
STE GENEVIEVE
PERRY
IRON
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TEXAS
REYNOLDS
CAPE GIRARDEAU
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NEW MADRID
BARRY
TANEY
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RIPLEY
Mc DONALD
BUTLER
DUNKLIN
PEMISCOT

1978 I&D CONDITIONS REPORT

PEST: (common name) Dutch Elm Disease
(specific name) Ceratocystis ulmi

HOST: All native elms

PRESENT CONDITIONS: Area - The disease was found statewide in 1978. a much heavier occurrence was found in the northern half of the state where sapling size elms are more common.

Location - Disease activity was present in all counties within the state.

Severity (specify measurements or estimates) - An approximate 25% increase in disease occurrence was noted in naturally occurring elms. The majority of trees were sapling size that had passed the resistant stage. Losses in large urban trees remained a steady decline with possibly a slight increase.

Losses (best estimates of volume and/or $) - A conservative estimate of losses due to this disease for 1978 would be five hundred thousand dollars. These losses are primarily associated with urban plantings.

TREND:

Past to present - A twenty-five percent increase in occurrence of the disease within natural regeneration was noted. Losses in urban areas continued at a steady decline.

Future - Next year should also show an increase in disease occurrence which will be linked to increased reservoirs of inoculum which are available as breeding habitat for the insects.

CONTROL PROJECTS (method, material, acres, results) - There are no specific control projects underway for this disease. Our main emphasis is on training of field personnel and the general public on recognition of the disease and control by sanitation.

COMMENTS: Missouri maintains a regenerative population of elms in old fields and fencerows; however, large mature elms outside of urban plantings are uncommon. Losses within urban areas due to property devaluation, removal costs, treatment costs, etc. are still of significant importance.

1978 I&D CONDITIONS REPORT

PEST: (common name) Sycamore Anthractnose
(specific name) Gnomonia platani

HOST: Sycamore and London plane trees

PRESENT CONDITIONS: Area - The disease occurred in heavy concentrations statewide in 1978.

Location - Severe damage was reported in all counties.

Severity (specify measurements or estimates) - A great increase in severity was noticed this year. Trees which normally were not severely affected were defoliated four and five times this year. The duration of this disease problem continued into mid- to late-June this year. A two-fold increase in defoliation was readily evident.

Losses (best estimates of volume and/or $) - Losses of severely weakened trees was noticeable this year. However, heavy losses in volumes or monetary figures were not present.

TREND:

Past to present - This year was significantly different in severity of the disease. Anthractnose occurs statewide normally but the duration of attack this year was greatly increased.

Future - The specific weather conditions were the controlling factors this year and will continue to be in the future.

CONTROL PROJECTS (method, material, acres, results) - Control of the disease is not feasible in natural stands. Very little control is possible with planted trees. Informing the public as to the disease's cause and severity was the major control method. Suggestions for increasing the vigor of affected trees was also a major media goal.

COMMENTS: A very cool, moist spring was evident across Missouri in 1978. The conditions were very condusive to infection and colonization by the anthractnose fungus. Severe and repeated defoliations were the norm this year. Most of the sycamore trees within the state did not refoliate completely until early to mid-July.

Dutch Elm Disease

The fungus Ceratocystis ulmi has been, and continues to be, a devastating influence in Missouri. Dutch elm disease has eliminated 90% of the mature elm trees (both urban and natural). Resistant young saplings continue to develop but only an isolated few ever reach pole size. A few of the monarch elms so characteristic of the early 1900's still remain surviving mainly through isolation or with the aid of systemic fungicide.

The disease is found consistently in the northern half of the state. Abandoned fields and fence rows support a sustaining source of young elms and disease. In 1978 an infected elm tree could be seen at the minimum of one every five miles of highway. Dutch elm disease was found on every surveillance trip with startling regularity. The disease can readily be categorized as statewide in occurrence during 1978. The numbers and occurrence of the disease were much heavier than evidenced in 1977.

The economic implications of the disease are restricted to urban areas. Elms of commercial size in the forest are insignificant in their numbers for their loss to be economically important. The estimated losses for Missouri during 1978 due to Dutch elm disease are five hundred thousand dollars. This loss is directly related to tree care, removal, and replacement. Prophylactic or treatment costs are not included.

The surveillance for Dutch elm disease covered in excess of one million acres during 1978. This survey indicated the disease's temporary increase in occurrence and its continuing presence. The next few years provide a bleak future for owners of large elms in Missouri. The increased availability of infested breeding sites for the vector can only result in a greater spread capability for 1979.

Bleeding Canker

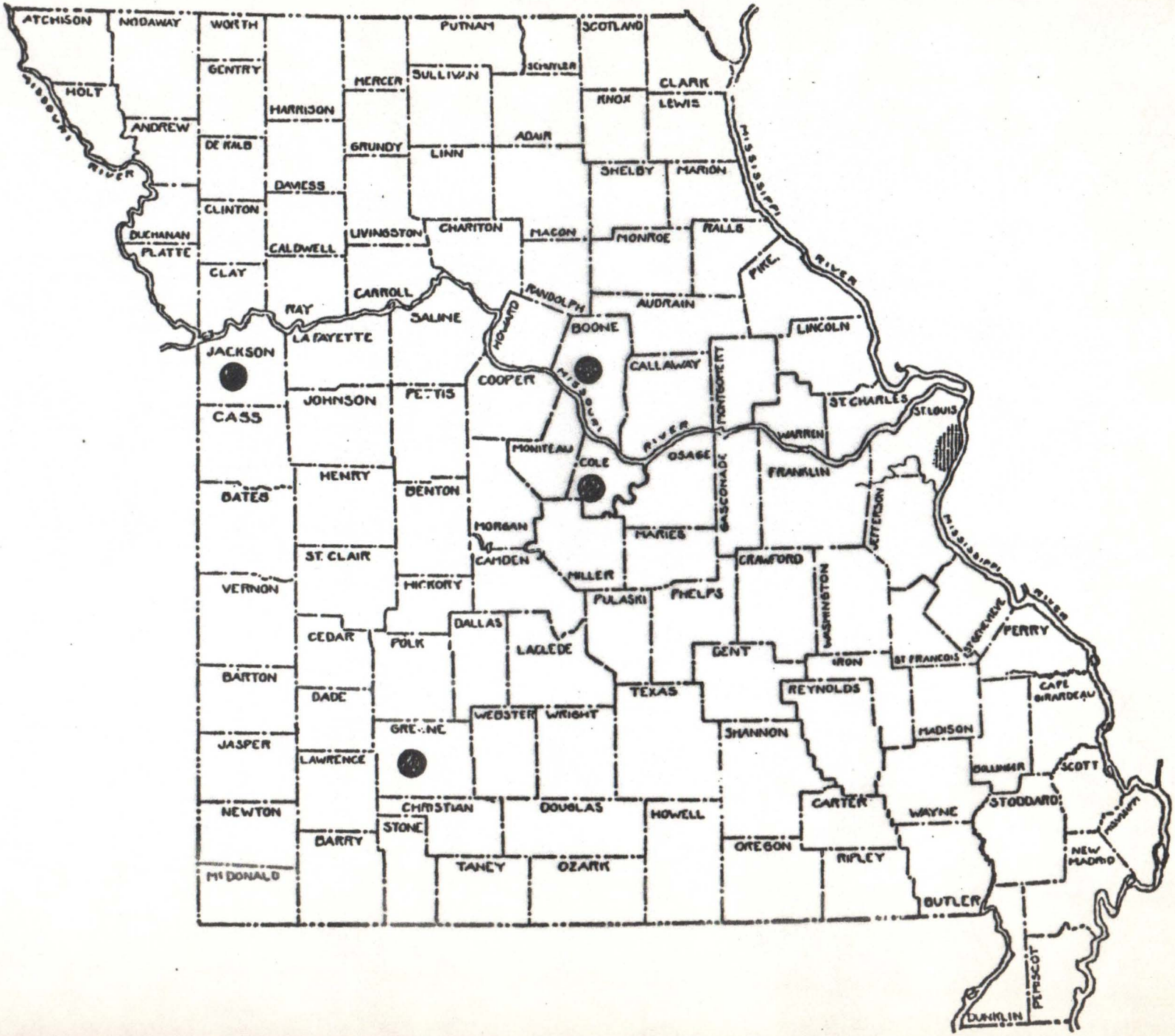
A wide variety of shade and forest tree species are affected by bleeding canker incited by the fungus Phytophthora cactorum. The disease was particularly heavy in Missouri during 1978. Russian olive trees were the major species affected. Damage occurred on maple and pin oak also.

The disease was verified in four counties this year (see attached map). Counties containing large urban areas have historically been the location of problems with this disease. The majority of trees surveyed were killed as a result of the infection. Replacement and removal costs for this disease are estimated at fifty thousand dollars.

Bleeding canker was more heavy this year than in 1977. This may be linked to the very wet spring and early growing season that we experienced this year. A total of five thousand acres were surveyed for this disease in 1978.

Bleeding canker is a minor disease in Missouri. However, its rapidly increasing occurrence could allow it to develop in to a severe shade tree problem.

Bleeding Canker



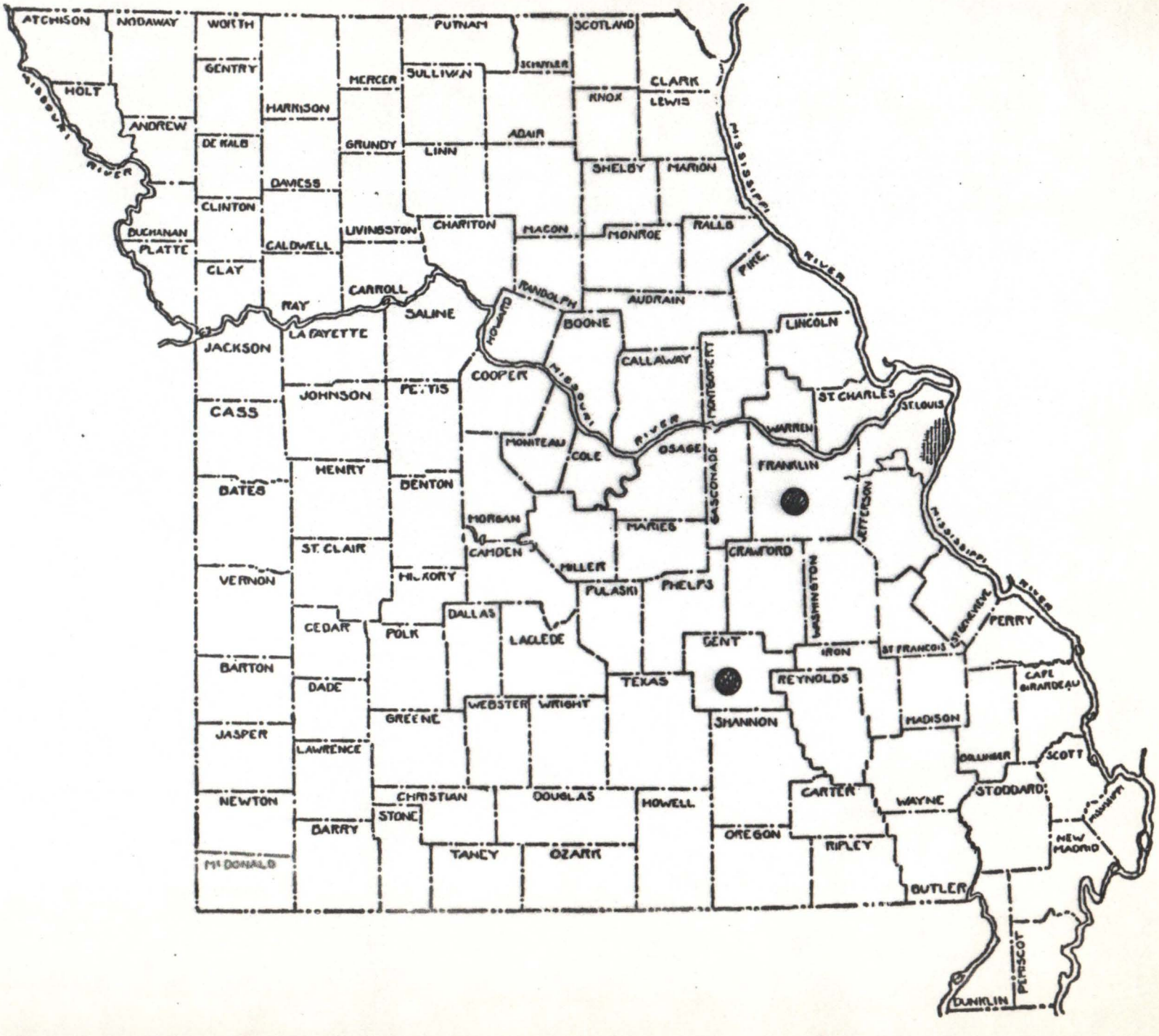
Fomes Root and Butt Rot

Fomes root and butt rot of Southern pines is a great concern in shortleaf pine stands across the state. The fungus, Fomes annosus, has the capability to severely restrict the growth and longevity of the only major pine timber species in Missouri.

This concern has led to a continuing surveillance for the disease but fortunately with little result. The disease was found to occur in two counties this year, Franklin and Dent (see attached map). A total of ten thousand acres were surveyed for the disease in 1978. Estimated losses due to Fomes root and butt rot for 1978 are ten thousand dollars. This includes reduced growth potential and mortality.

Fomes annosus has been a severe and widespread problem in the southeastern United States. It has the same capability for Missouri but fortunately the disease is continuing to remain at a fairly insignificant level.

Fomes Root and Butt Rot



Brown Spot Needle Blight

Missouri has a striving Christmas tree industry. A main concern for the growers is brown spot needle blight incited by the fungus Schirria acicola. This disease has the capability to render a Scotch pine Christmas tree unmerchantable due to its needlecast characteristics and therefore is capable of heavy economic losses.

A large portion of the Scotch pine Christmas trees being grown in Missouri are short needled varieties that are highly susceptible to the disease. This is the result of plantations established prior to the knowledge of genetic susceptibility, the desirability of such trees to the public, and the fact that many growers are still uninformed concerning the disease's characteristics.

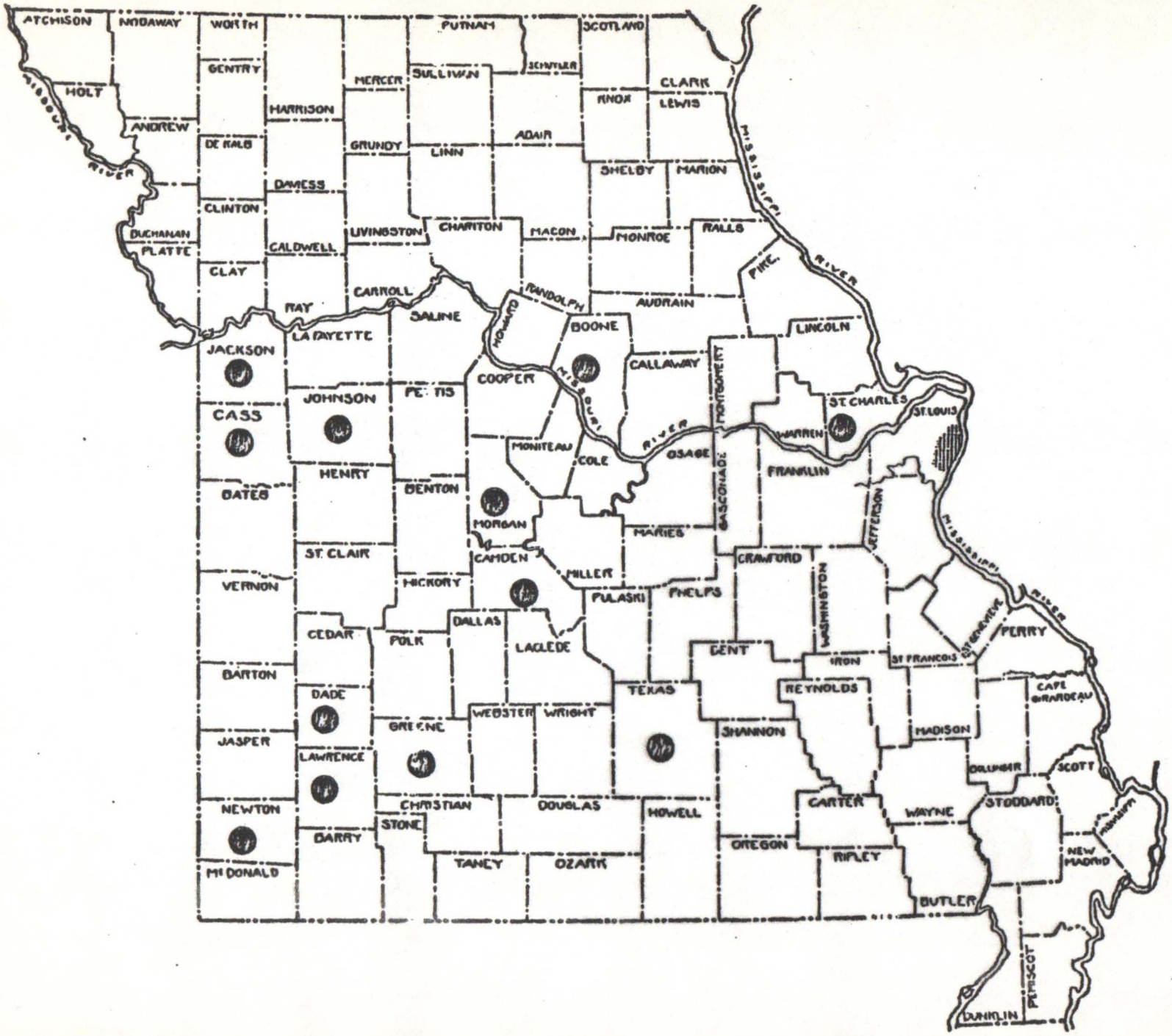
Defoliation of second-year needles is the common expression of the disease, however, current year needles can also be affected. Susceptible varieties rapidly become unmerchantable and then act as reservoirs of innoculum for the disease's spread. The majority of growers in the state are familiar with the disease's characteristics and willingly institute chemical control programs when the problem is discovered. Few growers can recognize the problem in the early infection stage.

The disease is widespread across the state. The greatest occurrence is in the southeastern quarter of the state. This distribution is directly linked to the location of Christmas tree plantations. Brown spot was found in twelve counties during 1978 (see

attached map). A total of fifteen hundred acres were surveyed for brown spot needle blight during 1978.

The results of this surveillance indicate that brown spot needle blight is a continuing problem in Missouri. Infestation levels were slightly lower than those found in 1977. An estimated total of one hundred and fifty thousand dollars in losses could be attributed to brown spot, state wide during this year.

BROWN SPOT NEEDLE BLIGHT



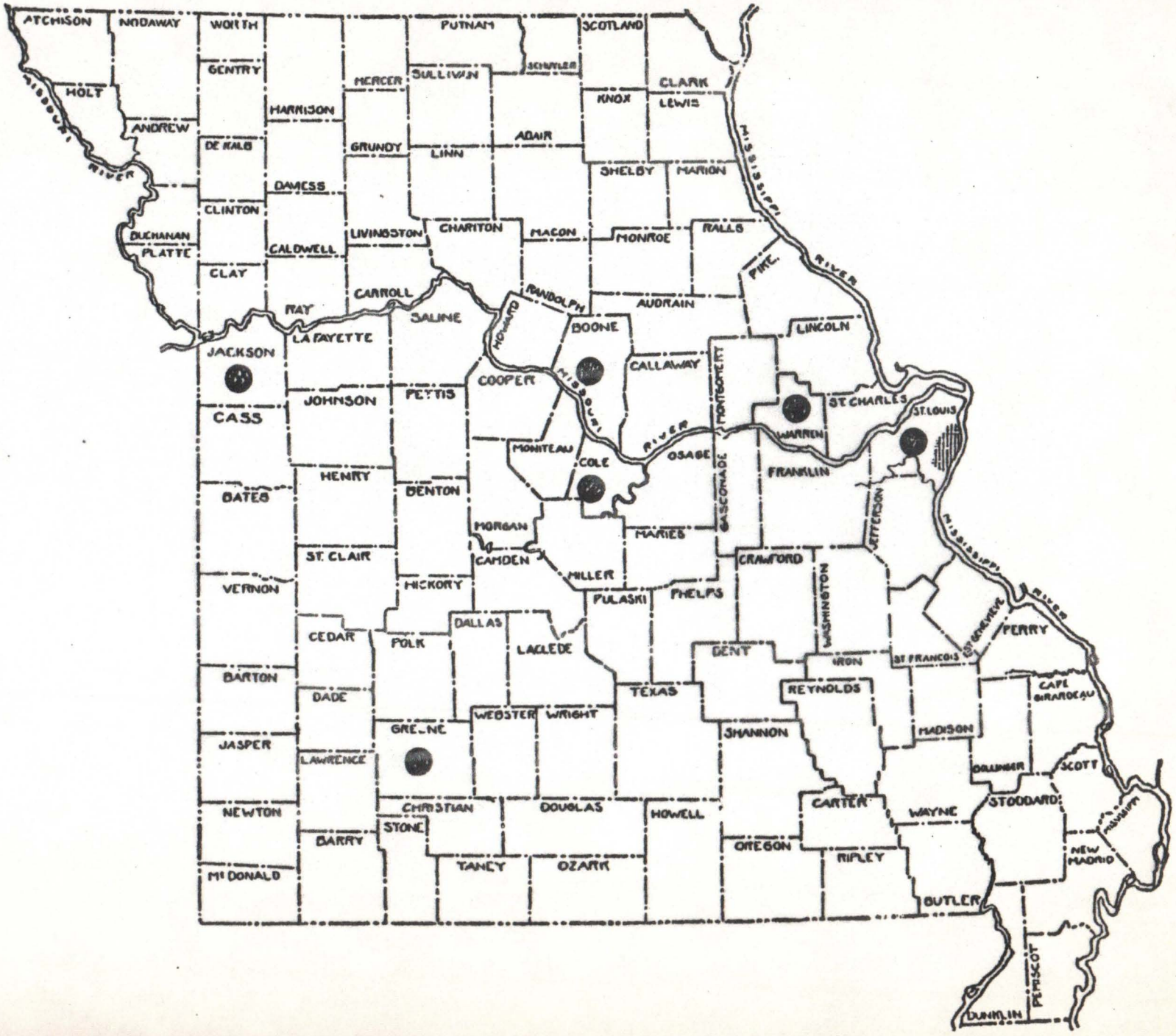
Rhizosphaera Needlecast

Rhizosphaera needlecast is a disfiguring disease of blue spruce incited by the fungus Rhizosphaera Kalkhoffii. Blue spruce is not native to Missouri but is widely planted as an ornamental. Therefore the major impact of this disease occurs in urban areas.

This needlecast disease has increased in its occurrence over 1977. The majority of counties containing infestations of the disease are heavily populated areas. The disease in this area has caused some losses but generally the main effect is disfigurement. However, the high value of these ornamental plantings would suggest an economical loss. Such a loss estimate is highly subjective, difficult to substantiate, and best avoided. Seldom is a tree killed by the disease so losses attributable to tree mortality are insignificant.

A total of two hundred thousand acres were surveyed for the disease. This survey demonstrated that the disease was present in six counties (see attached map) during 1978.

Rhizosphaera Needlecast



Diplodia Tip Blight

The major species of trees affected by Diplodia tip blight in Missouri are Austrian pines. Austrian pine is not native to Missouri but is widely planted as an ornamental. The disease caused by Diplodia pini is widespread across the state.

The disease is not generally as severe in Missouri as is found elsewhere. Main stem cankering seldom is evidenced on infected trees. The main impact of the disease is disfigurement of the host tree. Economic losses due to tree mortality would be approximately fifty thousand dollars for 1978. These losses are primarily associated with tree mortality and the resultant removal and replacement costs. Devaluation of property is not considered.

Diplodia tip blight was surveyed over two hundred thousand acres during 1978 in Missouri. The disease is primarily concentrated in ornamental plantings. The disease decreased in occurrence in 1978.

Sycamore Anthracnose

Anthracnose incited by Gnomonia platani is a yearly ritual for sycamores in Missouri. An extremely wet spring, during 1978 turned a generally insignificant occurrence into a severe tree stress situation. Severe defoliation was reported in all counties.

The disease commonly exhibits itself as a defoliation of sycamores in early spring. The refoliation of the trees generally allow them to regroup lost vigor. However, in 1978 the majority of sycamores were defoliated at least three times. Anthracnose aided by an extended cool wet spring continued to affect the trees until mid-June this year. Many trees did not attain complete refoliation until mid- to late-July. An increase in stem cankering by the action of the fungus was evident.

Sycamore has little commercial value within Missouri. The tree is widespread in both urban and forested areas and the extended period of defoliation elicited great concern among the general public. This was met by a multi-media approach at informing the public concerning the disease. Little economic impact or volume reductions resulted from the disease in 1978. Weakened individuals were lost as a result of the disease.

The disease showed a definite increase in occurrence over 1977. This was linked to weather conditions and cannot be extrapolated to future years. A total of one and a half million acres were surveyed for the disease during 1978.

- Oak Wilt -

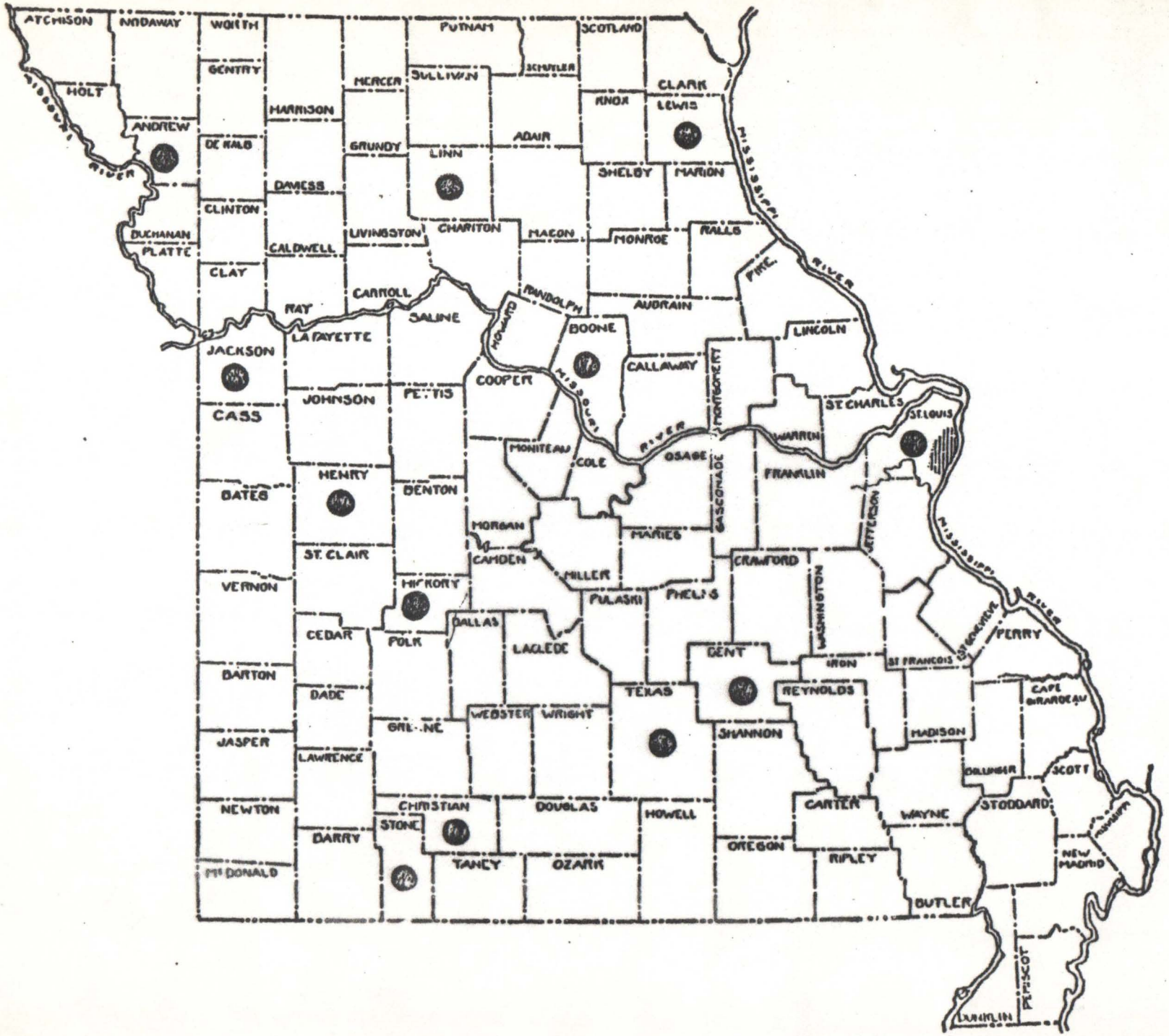
Oak wilt caused by the fungus Ceratocystis fagacearum has been a widespread problem in Missouri for several years. The fungus which severely affects members of the red oak group is generally ineffective against white oaks. White oak is one of the major timber species utilized by the lumber industry in Missouri. Red oaks and Black oaks, however, are not as economically important. These two factors restrict the economic impact of oak wilt in Missouri.

The spread of oak wilt problems into urban areas has begun to constitute a severe problem. The high value of such trees along with replacement and removal costs has caused significant financial losses. A combined estimate of losses in both urban and forest situations is approximately two hundred thousand dollars for 1978.

The effect of oak wilt on individual trees is extremely heavy but the effects within forest stands in Missouri have been minimal. Oak wilt infection areas were seldom found more than an acre in size. Losses of red and black oaks in such stands containing more valuable species can be advantageous. Oak wilt infection centers were generally scattered over the state (see attached map) in 1978 being found in twelve counties. The number of infection centers found was below that for 1977. However, oak wilt is considered to be an endemic problem throughout the state.

Surveillance for oak wilt infection centers was conducted over 750,000 acres during 1978. During this surveillance it became evident that oak wilt will continue as a recurring problem in Missouri but that its impact will be fairly minimal in forested areas. Missouri's characteristic "pin oak flats" and extensive urban plantings of pin oak has the potential to be severely affected by this disease. Fortunately this has not yet happened.

OAK WILT


ATCHISON
NODAWAY
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CALDWELL
RAY
CARROLL
LIVINGSTON
GRUNDY
MERCER
PUTNAM
SULLIVAN
SCHUYLER
SCOTLAND
CLARK
KNOX
LEWIS
ADAIR
LINN
CHARITON
MACON
SHELBY
MARION
MONROE
RALLS
PIKE
AUDRAIN
RANDOLPH
HOWARD
SALINE
LAFAYETTE
JACKSON
JOHNSON
PETTIS
COOPER
BOONE
CALLAWAY
MONTGOMERY
LINCOLN
ST CHARLES
ST LOUIS
WARREN
FRANKLIN
CASS
BATES
HENRY
BENTON
MONITEAU
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OSAGE
GASCONADE
MORGAN
MARIES
ST CLAIR
CAMDEN
MILLER
CRAWFORD
JEFFERSON
VERNON
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DALLAS
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DADE
TEXAS
REYNOLDS
CAPE GIRARDEAU
GREENE
WEBSTER
WRIGHT
SHANNON
MADISON
JASPER
LAWRENCE
BOLLINGER
SCOTT
CHRISTIAN
DOUGLAS
HOWELL
CARTER
WAYNE
STODDARD
NEWTON
STONE
BARRY
TANEY
OZARK
OREGON
RIPLEY
NEW MADRID
McDONALD
BUTLER
DUNKLIN
PEMISCOT
MISSOURI RIVER
MISSISSIPPI RIVER

DETECTION - SURVEILLANCE REPORT

Missouri - 1978

TRUE TREE GRASSHOPPER

The true tree grasshopper Dendrotettix quercus, (Pack) was first noted in Missouri during the middle 1960's. The insect was first noted in the Johnson Mountain area in northern Iron County. Populations occurred predictably rather heavy in the odd numbered years. Its range since 1965 fanned in a south and west direction from Iron County (see attached map).

During 1978, one million acres were surveyed for this insect. Hoppers were numerous in the forest but very little defoliation of the oaks, dogwood, or red maple occurred. In years of heavy defoliation of host tree, species may range from five to twenty-five percent. Because of the mixed character of tree species in Missouri and the infested area, defoliation by the grasshopper is usually never dramatic.

Very little loss of volume or vigor of affected trees occur as a result of defoliation which usually begins during the second week of July and terminates by the first week of August.

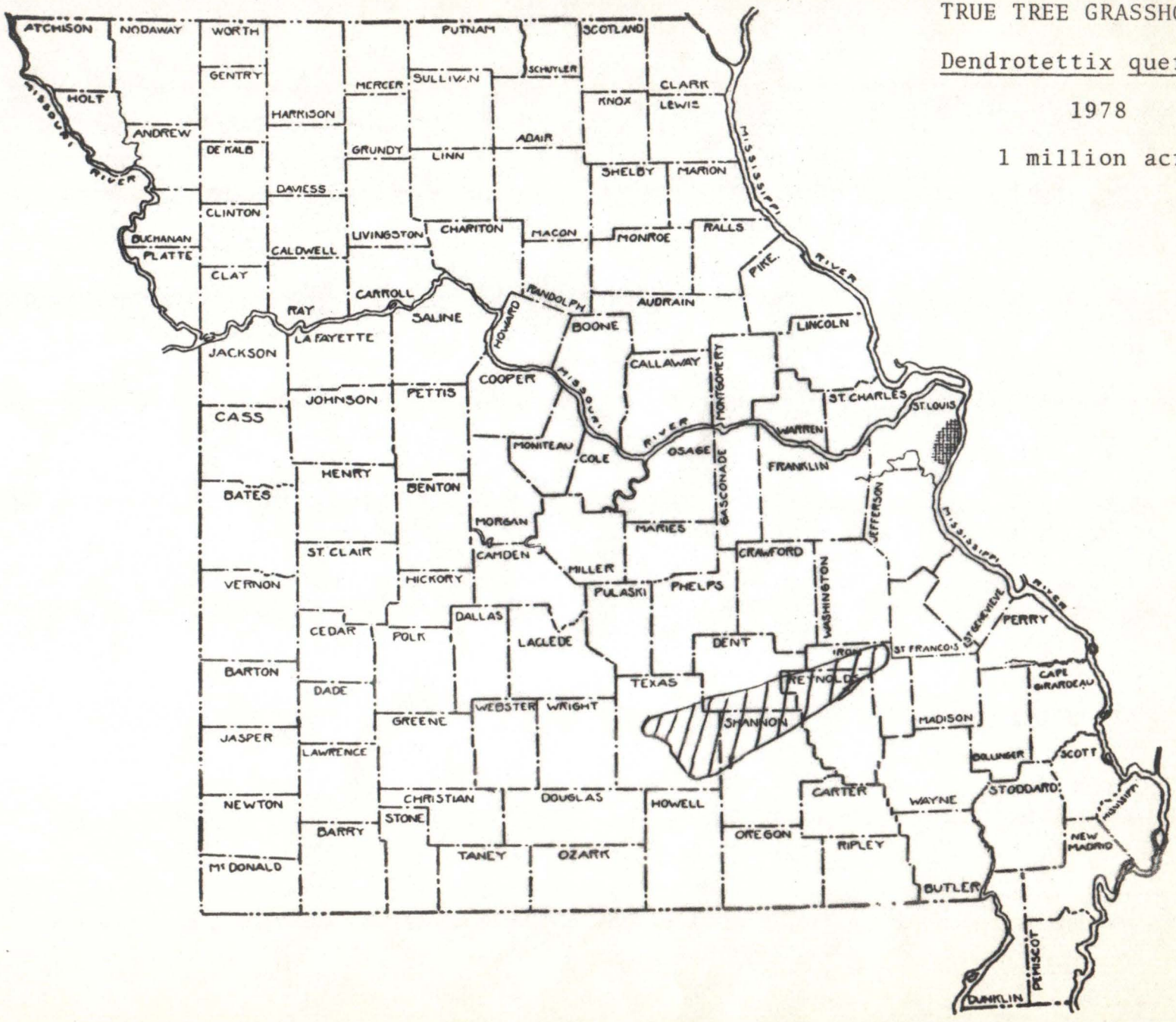
Populations and defoliation in 1978 were slightly greater than usual considering the even number year. Range of the hopper has moved to the Roby area in Texas County.

TRUE TREE GRASSHOPPER

Dendrotettix quercus

1978

1 million acres



DETECTION - SURVEILLANCE REPORT

Missouri - 1978

EASTERN TENT CATERPILLAR

The eastern tent caterpillar *Malacosoma americanum*, (F)., is a native insect in Missouri. Populations vary annually from none during some years to heavy during others. In spite of two consecutive severe winters in 1976 and 1977 the 1978 population of eastern tent caterpillar was high over the state on eastern black cherry and other species in the *Prunus* genera.

The eastern tent caterpillar lives in colonies producing one or two webs in crotches of limbs. In spring, 1978, three out of five eastern black cherry trees were infested having from between one to three webs per infested trees. Larvae defoliate infested trees as new leaves emerge in spring leaving many trees completely defoliated. Affected trees do refoliate later. There is only one generation in Missouri. Pupation occurs in late spring following defoliation. Later moths emerge and lay their typical egg masses encircling the host plant twigs.

Probably, egg parasitism is more responsible for population fluctuation than any other single factor. Severe low temperatures in winter seem to have little effect on viability of eggs.

In spring, 1978, roadside surveys were made for occurrence of the eastern tent caterpillar. The attached map indicates the most heavily affected area. This area covers approximately 2,500,000 acres. Black cherry in Missouri is an important tree species, however, volume harvested annually is insignificant. Insect infestation occurs on roadside volunteer specimens and in old fields. Some ornamental flowering crab trees and eastern black cherry trees are infested. These trees are either individually sprayed, webs and larvae mechanically destroyed or are allowed to develop.

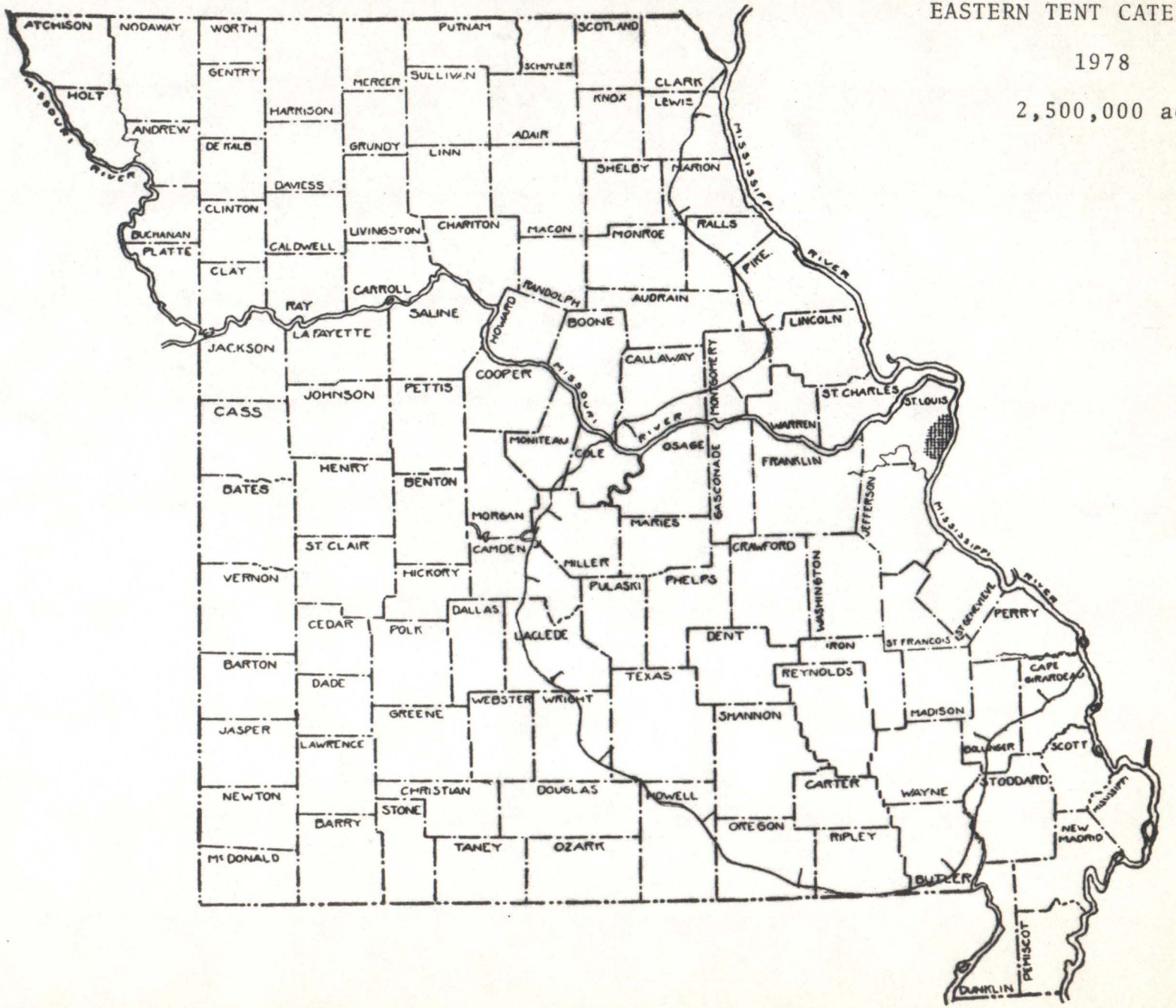
Infestation does not affect growth or result in mortality of the plant. The aesthetics of the plant are affected during webbing and defoliation.

Population trends indicate that infestation in 1979 will compare to those of 1978.

EASTERN TENT CATERPILLAR

1978

2,500,000 acres



DETECTION - SURVEILLANCE REPORT

Missouri - 1978

FALL WEBWORM

The Fall webworm Hyphantria cunea (Drury) is a native, annual occurring insect in Missouri. Its favorite host is black walnut, hickory, persimmon, eastern redbud, sycamore, and box elder. The defoliation and webbing produced on infested trees never results in growth or volume loss. The main consideration is loss of appearance of favorite shade trees in lawns and grounds.

In Missouri, activities of the fall webworm can first be seen in July. Defoliation and webbing occurs on infested trees through September.

The attached map indicates the general area of heaviest activity during 1978. Roadside surveys were made to determine amount of webbing and general geographic location. Actual area surveyed was approximately 1 million acres. The area infested probably covered 8 million acres.

Controls were primarily restricted to individual prize shade trees. Here webs were removed from the affected tree and larvae destroyed. Only a few owners had their trees sprayed for insect control.

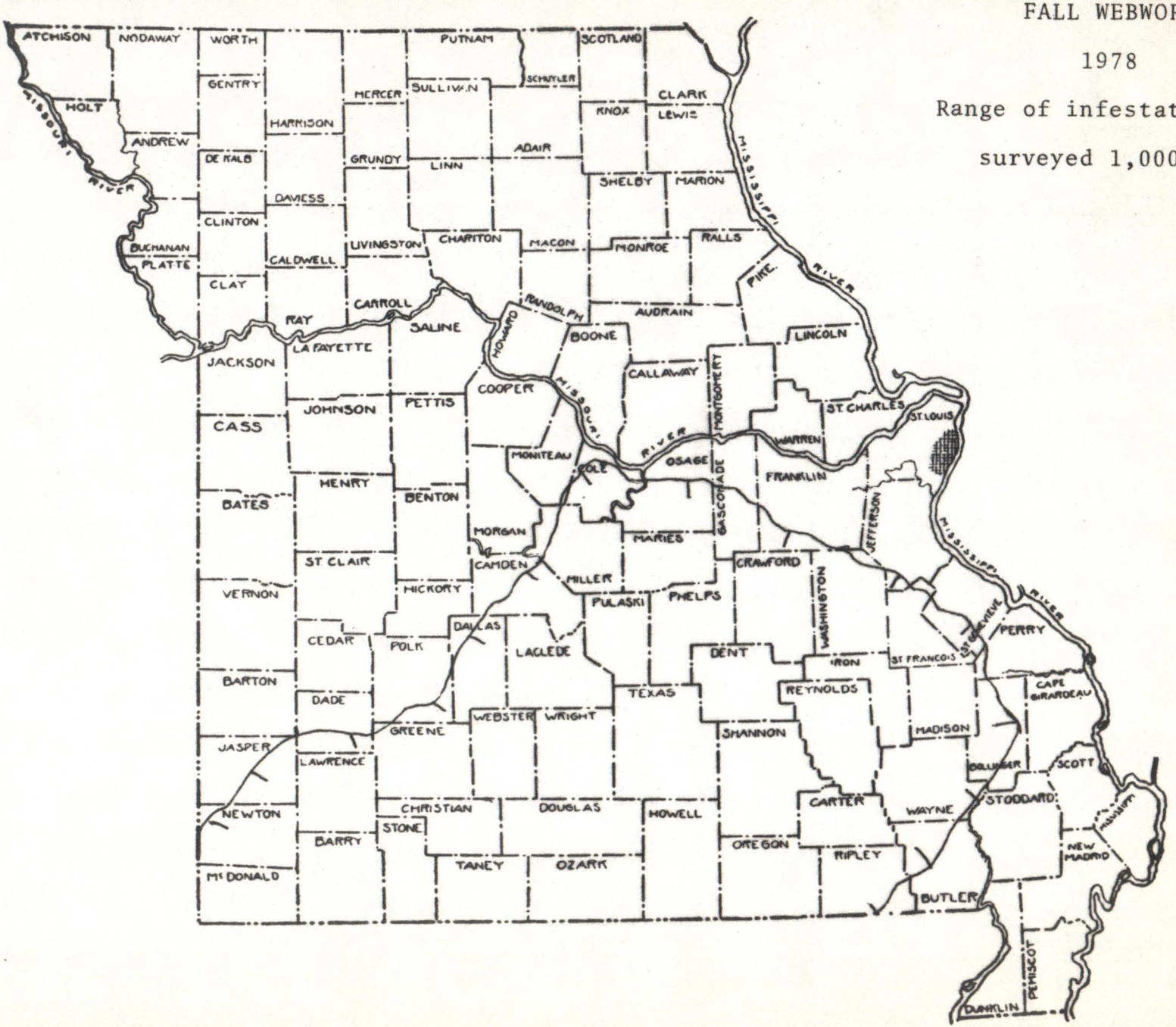
Insect and mammal predation on larvae appears to be light considering the constantly heavy infestation of fall webworm year after year.

FALL WEBWORM

1978

Range of infestation area

surveyed 1,000,000 acres



DETECTION - SURVEILLANCE REPORT

Missouri - 1978

GREEN STRIPED MAPLEWORM

The green striped mapleworm, Anisota rubicunda (F.), occurred in large numbers during 1978 in Pike and Ralls Counties on silver maple.

Infestation and defoliation occurred on large sawtimber-size silver maple in bottoms and along the Salt River in Ralls County.

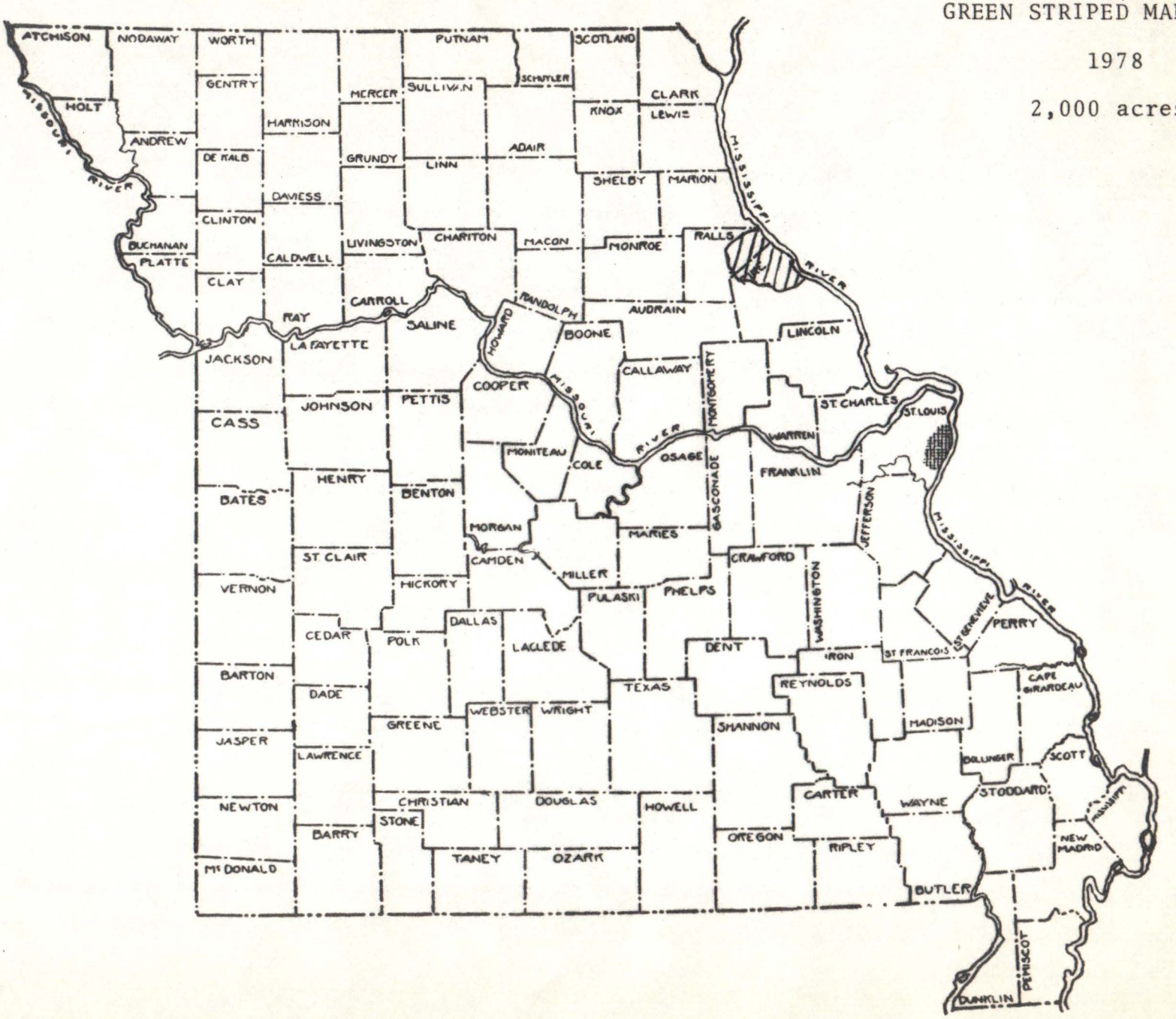
As indicated on the attached map, occurrence was concentrated on approximately an area covering 2,000 in both counties. Defoliation was light, ranging from five to fifteen percent. No timber loss or volume loss resulted on defoliated trees.

Moderate populations are predicted for 1979, however, no significant damage is expected.

GREEN STRIPED MAPLEWORM,

1978

2,000 acres



DETECTION - SURVEILLANCE REPORT

Missouri - 1978

LOOPER COMPLEX

The looper complex in Missouri causes very little damage of volume loss to trees in infested areas. Usually populations have peaks every four or five years. The loopers, tiers, etc., occurred in large numbers in late May and early June in east central Missouri during 1978.

Defoliation of mixed species occurred in Jefferson, Washington, St. Francois, and Ste. Genevieve counties. It was heavy in scattered areas ranging from five to fifty percent of infested trees. Area involved amounted to approximately one million acres, however, we surveyed approximately 200,000 acres for occurrence and distribution. The attached map indicates the approximate area of heaviest defoliation.

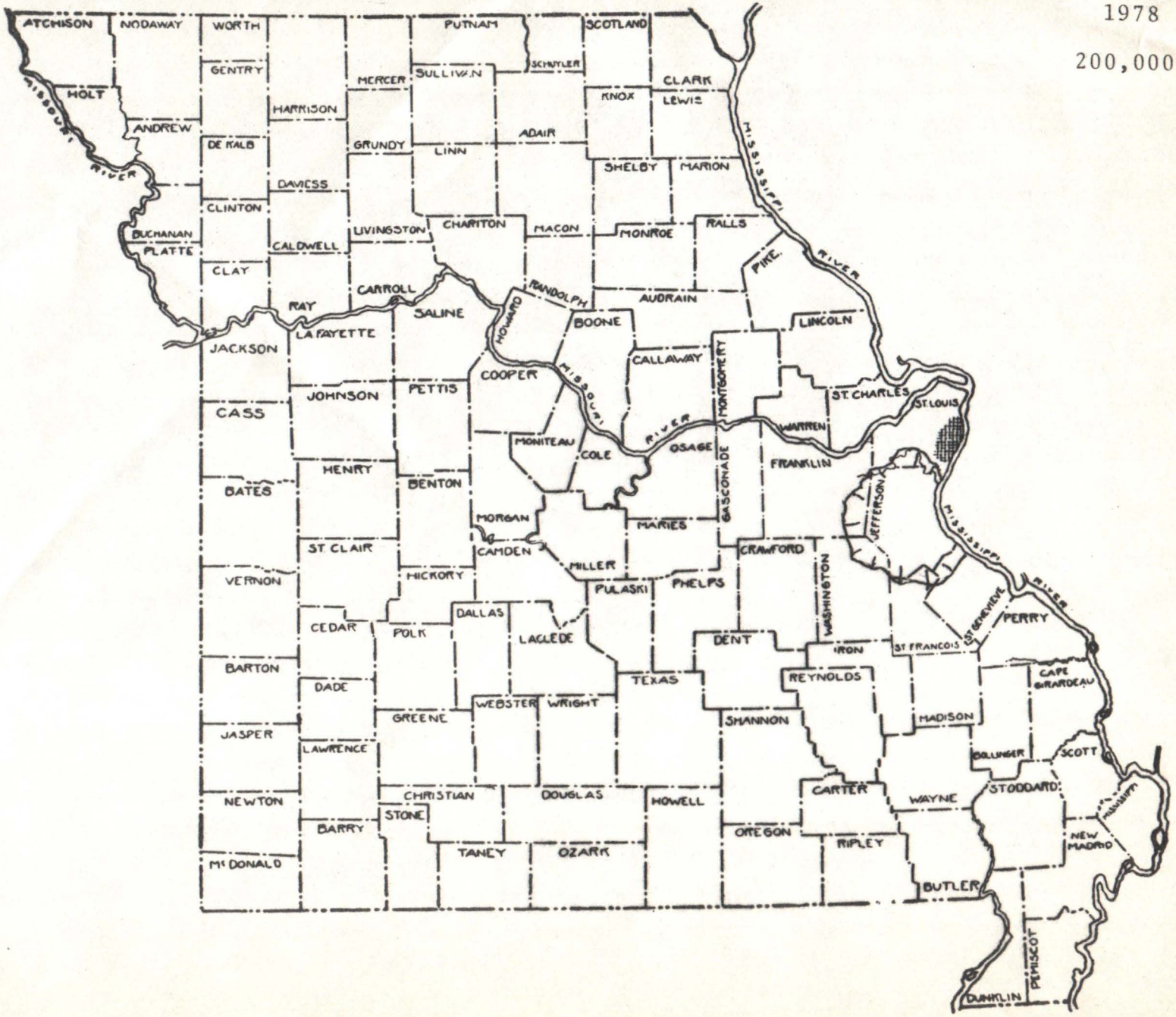
All defoliated trees refoliated as one might expect. The dramatic defoliation caused a number of inquiries from home owners in the affected area.

Larval and egg parasitism is probably largely responsible for population fluctuations.

LOOPER COMPLEX

1978

200,000 acres



DETECTION - SURVEILLANCE REPORT

Missouri - 1978

PALES WEEVIL

The Pales Weevil Hylobius pales (Hbst.) has been present in Scotch pine Christmas plantations in Missouri for at least ten years. It has been identified in six or seven areas in the state which includes a thinned post sized shortleaf pine stand near Winona, Missouri.

During spring, 1978, adult weevils were observed feeding on the main stems of young Scotch pine seedlings in a plantation in Cass County. We surveyed for Pales weevil on a total of 100 acres in the areas indicated on the attached map.

Adult weevils emerge from one-year-old seasoning roots from stumps in August and feed on the bark of twigs of Scotch pine. They overwinter around the stumps of trees. During the first warm days in spring, adults become active and begin feeding on bark of live trees and lay eggs on lateral roots of stumps produced from the previous years harvest.

Many growers who recognize their Pales weevil problem will treat their stumps with a material that will discourage egg laying and weevil feeding. In the past, a mixture of diesel

fuel and thiodan was used to spray on stumps. This material (thiodan) was not available to growers in 1978. Some growers used straight diesel fuel which will provide some protection.

We looked at five areas for Pales weevil during 1978 but positive identification was made in two plantations totaling 100 acres.

The damage caused by Pales weevil causes terminals and laterals to flag which reduces the value of the affected trees. It is predicted the populations will continue to build as more trees are planted and until a suitable control can be developed for the insect.

PALES WEEVIL

1978

100 acres